Reaping Rocks

Purpose

To make predictions about the origin of lunar rocks by first collecting, describing, and classifying neighborhood rocks.

Background [also see "Teacher's Guide" Pages 6, 7, photo on 15,16]

Geologists are scientists who study the formation, structure, history, and processes (internal and on the surface) that change Earth and other planetary bodies.

Rocks and the minerals in them give geologists key information about the events in a planet's history. By collecting, describing and classifying rocks, we can learn how the rocks were formed and what processes have changed them.

Geologists classify rocks into three types:

Igneous - rock formed when magma cools and hardens either below the surface (for example, granite) or on the surface during volcanic events (for example, basalt).

Sedimentary - rock formed by the collection, compaction, and cementation of mineral grains, rock fragments, and sand that are moved by wind, water, or ice to the site of deposition.

Metamorphic - rock formed when heat and/or pressure deep within the planet changes the mineral composition and grain size of existing rocks. For example, metamorphism changes limestone into marble.

We find all three rock types on Earth's surface and the rocks are constantly changing (recycling), very slowly because of heat, pressure, and exposure to weather and erosion.

The Moon's surface is dominated by igneous rocks. The lunar highlands are formed of anorthosite, an igneous rock predominantly of calcium-rich plagioclase feldspar. The lunar maria are made of layers of basaltic lava, not unlike the basaltic flows of the Columbia River Plateau or of Iceland. The orange glass found on the Moon's surface is another product of volcanic activity. Moon rocks are not exposed to weather nor are they eroded by wind, water, or ice. The Apollo astronaut's footprints are as fresh as the day they were made.

Preparation

Review and prepare materials listed on the student sheet. Spend time familiarizing the students with rock and mineral identification.

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Students may need more than one copy of "My Own Rock Chart" because it has spaces for only three samples. You may want to collect empty egg cartons, small boxes, or trays that the students could decorate themselves to display their rocks. Use of magnifying lenses or a stereo microscope would greatly enhance observations.

"Moon ABCs Fact Sheet" may come in handy during the wrap-up when students try to make predictions about the Moon rocks.

In Class

Talk about the qualities of rocks that we can describe: shape, size, color, texture, and the place where it was found. Then discuss the three rock classifications emphasizing that geologists classify rocks and interpret the origins of rocks based on their observations.

Encourage students to collect a variety of rocks with different colors and textures from your own locality, if possible. Remind them to choose naturally occurring materials – not cement or brick fragments! If it is not possible to collect rocks from the neighborhood, then try to obtain a commerically available set of common rocks. More than one student may choose the same rock. Students could also cut out pictures of rocks from magazines or study pictures of rocks in text books.

After each rock has been labeled with owner's name and location where it was found, have the students look carefully at the rock. To help them train their eyes, ask questions like: What colors do you see? Do you see grains? Are the grains large or small? Does the rock look glassy? Or does the rock show a banding pattern? Does the rock look frothy with a lot of holes? Do you see pebbles cemented together? Does the rock contain fossils?

Ask students to describe their rocks with as many adjectives or descriptive phrases as possible. Have the students classify the rocks as igneous, sedimentary, or metamorphic, and then try to interpret the rock origins. "My Own Rock Chart" is designed to help organize their observations and interpretations.

Wrap-up

Conclude the activity by challenging the students to predict what the lunar rocks look like and the possible origins based on what they have just learned about Earth rocks and based on the material in the "Moon ABCs Fact Sheet."

Display these rock collections and keep them until the students have a chance to compare with the lunar samples in "The Lunar Disk" activity on Page 39.

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Key Words

geologist

mineral

rock

igneous

sedimentary

metamorphic

Materials

rocks

empty egg carton, box, or other collection tray

labels

magnifying lens or stereo microscope

"My Own Rock Chart"

"Moon ABCs Fact Sheet"

Procedure

1. Display your rocks on a tray or egg carton, and label each one with the location of where you found it.

2. Look carefully at each rock with and without a magnifying lens or stereo microscope. What details can you see under magnification?

3. Describe what you see by filling out "My Own Rock Chart." Use as many adjectives or descriptive phrases as you can.

4. Classify your rocks as igneous, sedimentary or metamorphic. Try to interpret how your rocks were formed; that is, the origins. Add this information to your chart.

5. Now, based on your chart and the "Moon ABCs Fact Sheet," predict what the Moon rocks will look like.

6. How do you think the different Moon rocks might have formed?

My Own Rock Chart

Observations	Rock Sketch			
	Shape			
	Size			
	Colors			
	Texture			
	Collection Site			
Interpretations	Classification			
	Origin			